

1.0 INTRODUCTION

On June 14, 2002, the United States Environmental Protection Agency (USEPA) established Total Maximum Daily Loads (TMDLs) for 14 toxic pollutants, including five organochlorine compounds, for San Diego Creek, Upper and Lower Newport Bay, and Rhine Channel. The organochlorine (OC) compounds included four legacy pesticides (DDT, chlordane, dieldrin and toxaphene) and PCBs. TMDLs were established for chlordane, total DDT, and total PCBs in all waterbodies; dieldrin TMDLs were established for San Diego Creek, Lower Newport Bay, and Rhine Channel; and a TMDL for toxaphene was established only for San Diego Creek (USEPA, 2002). The USEPA TMDLs for the OC compounds were supported by a report prepared by staff of the Santa Ana Regional Water Quality Control Board (SARWQCB, 2000).

This report summarizes the information presented in the USEPA TMDL document (USEPA 2002) and presents additional information and modifications. In particular, impairment was reevaluated in accordance with the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (2004) (the State Listing Policy). The results of this impairment assessment differed from that previously performed by USEPA in that the water body-pollutant combinations requiring TMDLs have been revised, consistent with the new findings of impairment. Also, the loading capacities and existing loads were revised to reflect corrections and modifications to the USEPA technical TMDLs.

1.1 Watershed Background

The Newport Bay watershed covers an area of 154 square miles (98,500 acres) in central Orange County, California. Cities located partly or fully within the watershed include Orange, Tustin, Santa Ana, Irvine, Lake Forest, Laguna Hills, Costa Mesa, and Newport Beach (Figure 1-1); some unincorporated lands within the county are located within the watershed boundaries. The San Diego Creek watershed is part of the larger Newport Bay watershed and occupies about 105 square miles. The remainder of the Newport Bay watershed (about 49 square miles) includes the Santa Ana Delhi Channel, Bonita Creek, Big Canyon Wash, and other small drainages.

The central portion of the watershed is largely occupied by the relatively flat Tustin Plain, bounded to the northeast by the Santiago Hills and by the San Joaquin Hills to the southwest (Figure 1-2). Runoff from the mountains drains across the Tustin Plain and enters Newport Bay primarily via Peters Canyon Wash and San Diego Creek.

Lower Newport Bay is considered to be that portion of the bay south of the Pacific Coast Highway Bridge (Highway 1). The Lower Bay harbor is important for recreational use and supports nearly 10,000 pleasure boats, as well as many residential and commercial facilities. Upper Newport Bay (north of the Pacific Coast Highway Bridge) includes a 752-acre estuary, where saltwater from the Pacific

Ocean mixes with fresh water derived primarily from San Diego Creek. The Upper Bay supports six threatened or endangered bird species: California least tern, Belding's Savannah sparrow, brown pelican, coastal California gnatcatcher, peregrine falcon, and light-footed clapper rail. In 1992, more than 70 percent of the nation's remaining light-footed clapper rail population occurred here. The Bay is also a major stopping place for birds migrating along the Pacific Flyway, and up to 30,000 birds are present from August to April. At least 78 species of fish occur in the bay, providing recreational opportunities for anglers (mostly in the Lower Bay) and a source of food for predatory birds. Figure 1-3a shows important habitat areas for federally listed species in proximity to Newport Bay, and Figure 1-3b shows habitat areas throughout the watershed.

1.1.1 Land Use

Land use has changed dramatically in the watershed over the last 150 years. In the late 19th and early 20th centuries, land use changed from ranching and grazing to farming. After World War II, agricultural land use gave way to urbanization. In 1983, agriculture accounted for 22% of the land use in the watershed, while urban land use comprised 48% of the watershed area. By 2002, agriculture accounted for only about 5% of the total land use, while about 75% of the area was urbanized. The watershed still contains large areas of open space, mainly in the foothills and headland areas of the watershed where development has not yet occurred. Table 1-1 provides the latest available land use data for the San Diego Creek drainage and the Newport Bay watershed as a whole.

Table 1-1. Land Use in the Newport Bay Watershed

Land Use	San Diego Creek		Newport Bay Watershed	
	Acres	Percent	Acres	Percent
Vacant	21,910	28.5	23,462	23.9
Residential	11,668	15.2	19,420	19.7
Education/Religion/Recreation	15,811	20.6	17,393	17.7
Roads	10,295	13.4	15,774	16.0
Commercial	6,381	8.3	9,641	9.8
Industrial	3,965	5.2	5,263	5.4
Agriculture	5,092	6.6	5,147	5.2
Transportation	1,177	1.5	1,326	1.3
No code	440	0.6	936	0.9
Total	76,739	100	98,362	99.9

Source: Orange County Public Facilities and Resources Department, provided March 2002

1.1.2 Climate

The watershed experiences a Mediterranean climate, characterized by short, mild winters and dry summers. Average rainfall is about 13 inches per year, with 90 percent of the rainfall occurring between November and April.

1.1.3 Hydrology

The hydrology of the watershed has been substantially altered compared to historic conditions. In the mid-1800s, the Santa Ana River flowed into Newport Bay, while San Diego Creek and the small tributaries that drained the foothills flowed into the Swamp of the Frogs and ultimately to the Santa Ana River. To enable farming in the area, wetlands were drained and vegetation was cleared; drainages were channelized to convey runoff to San Diego Creek. In 1920, the Santa Ana River was permanently channelized to its current configuration for discharge to the ocean. With increasing urbanization, hydraulic capacity was increased in many of the drainages to prevent flooding. Alterations of the area's hydrology and hydraulics culminated with the channelization of San Diego Creek in the early 1960s, such that it discharges directly to Upper Newport Bay. The present estuarine conditions in the Bay developed as a result.

San Diego Creek is the major drainage channel in the Newport Bay watershed and contributes about 85% of the freshwater flow volume into Upper Newport Bay. San Diego Creek is divided into two reaches. Reach 1 is designated as the length from Upper Newport Bay to Jeffrey Road, while Reach 2 is the remaining section from Jeffrey Road to the headwaters of the creek. The drainage area of San Diego Creek (including its largest tributary, Peters Canyon Channel) accounts for about 77% of the watershed.

Daily flow records for San Diego Creek at the Campus Drive monitoring station reveal a wide range of flow rates. In dry weather, base flow typically ranges from 8 to 15 cubic feet per second (cfs). During wet weather, daily storm flows in San Diego Creek can range up to about 9,200 cfs, although most storm flows fluctuate between 20 and 815 cfs (Orange County Resources and Development Management Department [RDMD] data).

The second largest drainage in the watershed is that of the Santa Ana Delhi Channel, which accounts for about 11% of the Newport Bay watershed area and provides about 10% of the freshwater flow to Upper Newport Bay. Average dry weather flows in the Santa Ana Delhi channel are typically between 1 and 2 cfs, with storm flows ranging up to 1,370 cfs.

1.1.4 Water Quality

San Diego Creek and Newport Bay are identified on the State's Clean Water Act §303(d) list of impaired waters. Impairment in San Diego Creek Reach 1 is currently attributed to fecal coliform and pesticides; impairment in San Diego Creek Reach 2 is due to metals and unknown toxicity. Upper Newport Bay is impaired due to metals and pesticides; and Lower Newport Bay is impaired due to metals, pesticides and priority organics (2002 CWA §303(d) list). Potential sources of these pollutants include urban runoff, contaminated sediments, boatyards, agriculture, and unknown nonpoint sources.

TMDLs for the San Diego Creek-Newport Bay watershed have been adopted and are currently being implemented for fecal coliform (Newport Bay), sediments and nutrients (San Diego Creek and Newport Bay), diazinon and chlorpyrifos (San Diego Creek). TMDLs for other toxic pollutants are currently being developed; these TMDLs address the organochlorine pollutants (DDT, PCBs, chlordane and toxaphene), which were included in the TMDLs for toxic substances promulgated by USEPA in 2002.